UNITED STATES PATENT AND TRADEMARK OFFICE

𝒟

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,240	10/12/2001	Sae-Young Chung	12144-009001	9712

26161   7590   05/17/2007
FISH & RICHARDSON PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER
BHATTACHARYA, SAM

ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
05/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	09/976,240	CHUNG ET AL.
	Examiner	Art Unit	
	Sam Bhattacharya	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>01 March 2007</u>.

2a) ☒ This action is **FINAL.**   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1,2,5-17,19,36 and 37* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1,2,5-17,19,36 and 37* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some *   c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.   Claims 1, 2, 5-14, 16, 17, 19, 36 and 37 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Leung et al. (U.S. Patent 6,262,980) in view of Schmutz et al. (US

2001/0004592).

As to claim 1, Figures 2 and 3 in Leung show a method comprising:

in a wireless communication system having sectors including a first sector and a second

sector, the first sector being in a first cell, the second sector being in a first cell or another cell

(see FIG. 3), altering the SIR of at least one user in the first sector, the at least one user in the

first sector being in communication with the communication system only via the first sector

("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell

is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector

antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col.

6, lines 51-56). "Time is slotted such that a packet can be transmitted in each slot, and the

downlink and uplink between terminals and BS are provided by Time-Division Duplex (TDD)

using the same radio spectrum" (Col. 6, lines 64-67). "Time slots need to be dynamically

allocated to various transmitters to send data packets such that a given SIR can be achieved at the

intended receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are

poor, few BS's should be scheduled to transmit at the same time so that a target SIR threshold

can be met for successful reception at the receiving ends" (Col. 7, lines 31-34). "In the SRA

method, time slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise

as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have

traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different

time subframes (labeled "a" in each sector), thus causing no interference within the same cell"

(Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid

interference from major sources in the neighboring cells. This is particularly so when the traffic

load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2

in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By

examining the staggered order for Sector 1, 2 and 3, note that they will not transmit

simultaneously, and thus will not interfere with each other, provided each has a traffic load of

less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)"

(Col. 8, lines 38-48)).

Leung fails to specifically disclose temporarily reducing transmission power on a forward

link in the second sector, the reducing of the transmission power being dynamically determined

based on a determination of a current state of transmissions to one or more users in the second

sector, each of the one or more users in the second sector being in communication with the

communication system only via the second sector. However, in an analogous art, Schmutz

teaches a sectorized cell in which transmission power is temporarily reduced on a forward link in

a sector, the reducing of the transmission power being dynamically determined based on a

determination of a current state of transmissions to one or more users in the sector, each of the

one or more users in the second sector being in communication with the communication system only via the sector. See FIG. 1, paragraph 12, lines 1-3, paragraph 14, lines 1-10, paragraph 23, lines 1-18 and paragraph 37, lines 1-11. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Leung by incorporating the features taught by Schmutz for the purpose of avoiding having to reduce transmit power of all sectors of the cell and thereby conserving system resources.

As to claim 2, the Leung reference discloses the method of claim 1 in which the pattern is organized in a sequence of time slots and the pattern defines which of the sectors has transmissions turned on or off in each of the time slots ("it is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus will not interfere with each other, provided each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claim 5, the Leung reference discloses the method of claim 4 in which the current state of transmissions includes a status of transmissions scheduled in the second sector (see Col. 7, lines 22-42).

As to claim 6, the Leung reference discloses the method of claim 5 in which the current

state of transmissions includes transmission rates of the second sector ("traffic load" in Col. 11,

line 32 to Col. 12, line 16).

As to claim 7, the Leung reference discloses the method of claim 4 in which the current

state of transmissions includes a next time slot usage at the second sector ("in the ESRA method,

the procedure shown in FIG. 6 is invoked for each time frame by each sector in every cell to

assign available time slots in the frame to pending packets for transmission. Once a packet is

scheduled for transmission in a time slot, the slot becomes unavailable to other packets" (Col. 10,

line 65 to Col. 11, line 3)).

As to claim 8, the Leung reference discloses the method of claim 4 in which the current

state of transmissions includes a forward link SIR of users in the at least one other sector (see

Figure 4 and Col. 9, lines 31-58).

As to claim 9, the Leung reference discloses the method of claim 4 in which the current

state of transmissions includes user location ("depending on terrain and fading, a certain terminal

(e.g., house) may be constantly unable to receive a signal with a satisfactory SIR due to its fixed

location. The transmission for other terminals may always be successful. Thus, terminals at

"good" and "poor" locations should be served according to different time-slot reuse patterns,

which is called Time Slot Reuse Partitioning (TSRP)" (Col. 7, lines 22-28)).

As to claim 10, the Leung reference discloses the method of claim 4 in which the current

state of transmissions includes a fairness setting for one or more users ("without loss of

generality, consider that terminals of all classes have an identical traffic load" (Col. 11, lines 38-

39). "Using ESRA terminal classification and scheduling, packet transmission for all terminal

classes can be successfully received given a specific SIR threshold" (Col. 15, lines 52-54). See

also Col. 11, line 32 to Col. 12, line 16).

As to claim 11, the Leung reference discloses the method of claim 4 in which the current

state of transmissions includes an application type of one or more user or QoS level for one or

more users ("to ensure the required reception quality in the given environment, only time slots in

subframes a, b and c as indicated in FIG. 3 would be used for transmission in each sector. The

control limits the degree of concurrent transmissions, and thus the amount of interference, to

achieve a target SIR for the desirable quality of service ("QoS")" (Col. 8, lines 60-65)).

As to claim 12, the Leung reference discloses the method of claim 1 in which temporarily

reducing the transmissions comprises turning transmissions on and off in selected sectors

according to the pattern ("it is easy to see from FIG. 3 that if all sectors have traffic load of less

than one-sixth of total channel capacity, all packets are transmitted in different time subframes

(labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-

32). "Besides managing intra-cell interference, the SRA method helps avoid interference from

major sources in the neighboring cells. This is particularly so when the traffic load is low to

moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom

cell and Sector 3 in the upper cell are the major sources of interference. By examining the

staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus

will not interfere with each other, provided each has a traffic load of less than one-third of total

channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

As to claim 13, the Leung reference discloses the method of claim 12 in which the pattern

includes turning off transmissions in the sector sector more frequently to help users in the first

sector having lower communication rates ("TSRP divides the time frame (i.e., bandwidth) into a dedicated portion and a shared portion. At most one packet is transmitted among four neighboring cells during each time slot in the dedicated portion and up to three packets can be transmitted simultaneously in every cell in the shared portion. The purpose is to allow terminals at "good" and "poor" locations to use time slots in the dedicated and shared portion, respectively" (Col. 7, lines 35-42)).

As to claim 14, the Leung reference discloses the method of claim 1 also including arranging a frequency reuse factor of one or higher in the wireless system ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56). As the applicant specification described that "Figure 1 shows frequency or time reuse factor of three" for three-sectored cells (page 6, line 18), Figure 2 in Leung shows six-sectored cells and thus, a frequency reuse factor of six).

As to claim 16, the Leung reference discloses apparatus comprising

wireless transmission facilities ("sector antennas") for sectors including a first sector and a second sector of a wireless communication system, the first sector being in a first cell, the second sector being in the first cell or another cell ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56)), and

control facilities ("Base Stations") connected to the wireless transmission facilities and

configured to alter the SIR of at least one user in the first sector. ("time is slotted such that a

packet can be transmitted in each slot, and the downlink and uplink between terminals and BS

are provided by Time-Division Duplex (TDD) using the same radio spectrum" (Col. 6, lines 64-

67). "Time slots need to be dynamically allocated to various transmitters to send data packets

such that a given SIR can be achieved at the intended receiver for successful reception" (Col. 7,

lines 2-5). "When the receiving locations are poor, few BS's should be scheduled to transmit at

the same time so that a target SIR threshold can be met for successful reception at the receiving

ends" (Col. 7, lines 31-34). "In the SRA method, time slots are grouped into 6 subframes and

sectors are labeled by 1 to 6 anti-clock-wise as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy

to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel

capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus

causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell

interference, the SRA method helps avoid interference from major sources in the neighboring

cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for

Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are

the major sources of interference. By examining the staggered order for Sector 1, 2 and 3, note

that they will not transmit simultaneously, and thus will not interfere with each other, provided

each has a traffic load of less than one-third of total channel capacity (i.e., using only subframes

a and b for transmission)" (Col. 8, lines 38-48)).

Leung fails to specifically disclose temporarily reducing transmission power on a forward

link in the second sector, the reducing of the transmission power being dynamically determined

based on a determination of a current state of transmissions to one or more users in the second

sector, each of the one or more users in the second sector being in communication with the

communication system only via the second sector. However, in an analogous art, Schmutz

teaches a sectorized cell in which transmission power is temporarily reduced on a forward link in

a sector, the reducing of the transmission power being dynamically determined based on a

determination of a current state of transmissions to one or more users in the sector, each of the

one or more users in the second sector being in communication with the communication system

only via the sector. See FIG. 1, paragraph 12, lines 1-3, paragraph 14, lines 1-10, paragraph 23,

lines 1-18 and paragraph 37, lines 1-11. Therefore, it would have been obvious to one having

ordinary skill in the art at the time the invention was made to modify the method of Leung by

incorporating the features taught by Schmutz for the purpose of avoiding having to reduce

transmit power of all sectors of the cell and thereby conserving system resources.

As to claim 17, the Leung reference discloses the apparatus of claim 16 in which the

control facilities comprise sector controllers for controlling the wireless transmission facilities

for the respective sectors ("FIG. 2 shows a service area in a wireless network divided into

hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and

each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in

FIG. 2, at the center of the cell" (Col. 6, lines 51-56). It is inherent that a Base Station comprises

sector controllers to control the sector antennas).

As to claim 19, the Leung reference discloses apparatus comprising

a sector controller adapted to control transmissions in a first sector of a first cell of a

wireless communication system, the transmissions in the first sector being to at least one user in

the first sector, the at least one user communicating with the communication system only via the first sector, the sector controller further adapted to alter the SIR of the at least one user in the first sector by communication with other sector controllers in the first cell or in a second cell ("FIG. 2 shows a service area in a wireless network divided into hexagon shaped cells. Each cell is further divided into multiple sectors numbered 1 to 6, and each sector is covered by a sector antenna co-located with a Base Station (BS), not shown in FIG. 2, at the center of the cell" (Col. 6, lines 51-56). It is inherent that a Base Station comprises sector controllers to control the sector antennas. "Time is slotted such that a packet can be transmitted in each slot, and the downlink and uplink between terminals and BS are provided by Time-Division Duplex (TDD) using the same radio spectrum" (Col. 6, lines 64-67). "Time slots need to be dynamically allocated to various transmitters to send data packets such that a given SIR can be achieved at the intended receiver for successful reception" (Col. 7, lines 2-5). "When the receiving locations are poor, few BS's should be scheduled to transmit at the same time so that a target SIR threshold can be met for successful reception at the receiving ends" (Col. 7, lines 31-34). "In the SRA method, time slots are grouped into 6 subframes and sectors are labeled by 1 to 6 anti-clock-wise as shown in FIG. 2" (Col. 7, lines 63-65). "It is easy to see from FIG. 3 that if all sectors have traffic load of less than one-sixth of total channel capacity, all packets are transmitted in different time subframes (labeled "a" in each sector), thus causing no interference within the same cell" (Col. 8, lines 28-32). "Besides managing intra-cell interference, the SRA method helps avoid interference from major sources in the neighboring cells. This is particularly so when the traffic load is low to moderate. Consider the downlink for Sector 1 in the middle cell of FIG. 2. Sector 2 in the bottom cell and Sector 3 in the upper cell are the major sources of interference. By examining the

staggered order for Sector 1, 2 and 3, note that they will not transmit simultaneously, and thus

will not interfere with each other, provided each has a traffic load of less than one-third of total

channel capacity (i.e., using only subframes a and b for transmission)" (Col. 8, lines 38-48)).

Leung fails to specifically disclose temporarily reducing transmission power on a forward

link in a second sector, the second sector being in the first or second cell, wherein the reduction

in transmission power is dynamically determined based on a current state of transmissions to one

of more user in the second sector being in communication with the communication system only

via the second sector. However, in an analogous art, Schmutz teaches a sectorized cell in which

transmission power is temporarily reduced on a forward link in a second sector, the second sector

being in the first or second cell, wherein the reduction in transmission power is dynamically

determined based on a current state of transmissions to one of more user in the second sector

being in communication with the communication system only via the second sector. See FIG. 1,

paragraph 12, lines 1-3, paragraph 14, lines 1-10, paragraph 23, lines 1-18 and paragraph 37,

lines 1-11. Therefore, it would have been obvious to one having ordinary skill in the art at the

time the invention was made to modify the method of Leung by incorporating the features taught

by Schmutz for the purpose of avoiding having to reduce transmit power of all sectors of the cell

and thereby conserving system resources.

As to claims 36 and 37, Leung discloses estimating a signal-to-interference-and-noise

ratio based on information received from the mobile station; and determining an encoding and

modulation scheme for the data packet based on the estimated signal-to-interference-and-noise

ratio. Moreover, each sector transmits a pilot signal and the received information comprises

information indicating a strength of the signals detected by the mobile station. See col. 2, lines

35-42.

3.   Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. in

view of Schmutz, and further in view of 3GPP2 C.P9010, CDMA 2000 High Rate Data Packet

Interface Specification, Ballot Resolution Version, September 12, 2000.

As to claim 15, the combination of Leung and Schmutz discloses the method of claim 1.

It further discloses "the ESRA method could be used even for real-time traffic such as voice and

video services" (Col. 15, lines 60-62) and "although a TDMA system was used to illustrate

various embodiments of the invention, it can be appreciated that other systems fall within the

scope of the invention" (Col. 16, lines 18-21). However, Leung and Schmutz do not explicitly

disclose the wireless system comprises 1xEV-DO. The 3GPP2 C.P9010 reference teaches the

wireless system comprises 1xEV-DO (see pages 1-1 to 1-11).

Therefore, it would have been obvious to one having ordinary skill in the art at the time

the invention was made to modify the method of Leung and Schmutz in which the wireless

system comprises 1xEV-DO, as taught by 3GPP2 C.P9010, in order to support other new

wireless systems.

Response to Arguments

4.   Applicant's arguments filed 3/1/07 have been fully considered but they are not

persuasive.

Examiner respectfully disagrees with Applicant's arguments. Schmutz teaches that the

frequency allocation within respective cells and the separation between adjacent cell sites

prevents mutual interference among the channels. Schmutz also teaches the use of lower power

transmitters that temporarily reduce transmission power (the transmitters operating at lower

power levels) in this sectorized sytem and that the varations of transmit power is based on the

state of transmission of users in the sectors. See FIG. 1, paragraph 12, lines 1-3, paragraph 14,

lines 1-10, paragraph 23, lines 1-18, paragraph 36, lines 1-9 and paragraph 37, lines 1-11.

Accordingly, Schmutz teaches a sectorized cell in which transmission power is temporarily

reduced on a forward link in a sector, the reducing of the transmission power being dynamically

determined based on a determination of a current state of transmissions to one or more users in

the sector, each of the one or more users in the second sector being in communication with the

communication system only via the sector.

Conclusion

5.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Bhattacharya whose telephone number is (571) 272-7917. The examiner can normally be reached on Weekdays, 9-6, with first Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, George Eng can be reached on (571) 272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sb

GEORGE ENG
SUPERVISORY PATENT EXAMINER